Ontario Water Resources Commission.
Division of Plant Operations.

1971 OPERATING SUMMARY

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WESTMINSTER TWP.

WATER POLLUTION CONTROL PLANT

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Water management in Ontario

Ontario
Water Resources
Commission

We are pleased to submit for your consideration a summary of operation during 1971 of the water pollution control plant serving your community.

This operating summary contains parameters normally used to measure plant performance and loading, as well as relevant cost data. Because of the concern over eutrophication of our lakes and of the requirement, in many parts of Ontario, to remove the major contributing factor, results of analysis for phosphorus appear in this summary.

DS Caverly

D.S. Caverly,
General Manager.

DMcTavish

D.A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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WESTMINSTER TWP.

WATER POLLUTION CONTROL PLANT

operated for

THE TOWNSHIP OF WESTMINSTER

by the

ONTARIO WATER RESOURCES COMMISSION

1971 ANNUAL OPERATING SUMMARY

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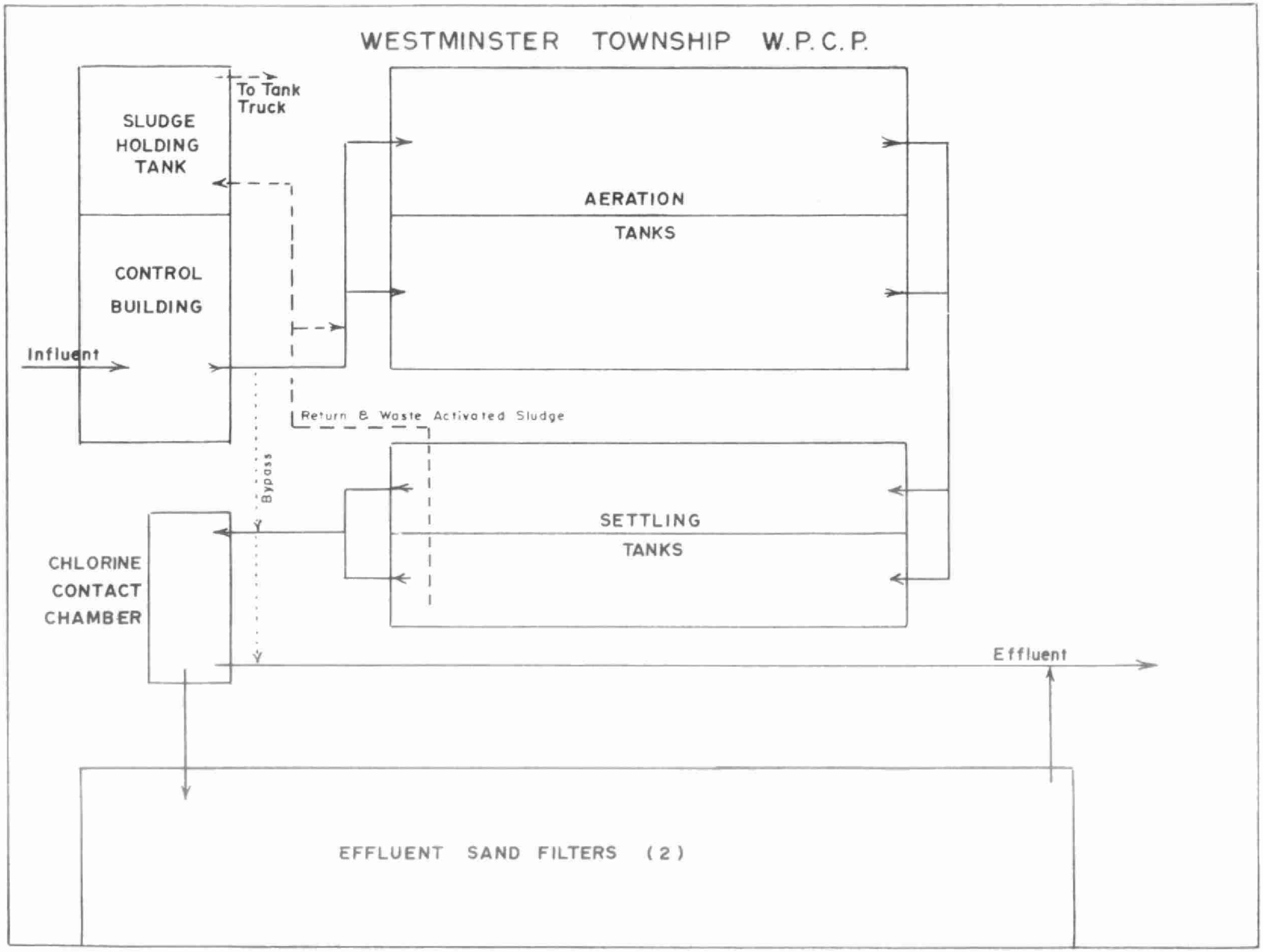

WESTMINSTER TOWNSHIP W.P.C.P.
To Tank Truck
SLUDGE HOLDING TANK
CONTROL BUILDING
Influent
AERATION TANKS
Return & Waste Activated Sludge
Bypass
SETTLING TANKS
CHLORINE CONTACT CHAMBER
Effluent
EFFLUENT SAND FILTERS (2)

DESIGN DATA

PROJECT NO.	2-0033-59
TREATMENT	Extended Aeration
DESIGN FLOW	0.25 mgd
DESIGN POPULATION	5,000

PRETREATMENT

Comminution

Type: Barminutor
Size: One Model B (12")
Chicago Pump Co.

RAW SEWAGE PUMPS

Type: Chicago Pump
Size: Two 100 gpm @ 23' tdh (#1 pump standby powered by Wisconsin gasoline engine)

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air; single-pass
Size: Two 54' x 27' x 14' (252,000 gal)
Retention: 24.2 hr

Diffusers

- Discfusers on swing arm

Air Supply

Type: Sutorbilt
Size: Three 337 scfm @ 7 psi

Secondary Sedimentation

Type: Link-Belt
Size: Two 54' x 8' x 9.25' (50,200 gal)
Retention: 4.80 hr
Loading: Surface, 580 gal/ft^2/day
Weir, 1955 gal/ft/day

CHLORINATION

Type: W & T
Size: One 100 lb/day

Chlorine Contact Chamber

Size: One 10' x 7' x 9' (3930 gal)
Retention: 22.7 min

OUTFALL

- to Dingman Creek

TERTIARY TREATMENT

Effluent Sand Filters

Size: Four units (26,900 sq ft or 0.62 acres)
Depth: 30" of sand (min)
Capacity: .405 mil gal/acre/day

SLUDGE HANDLING

Sludge Holding Tank

Size: 4,460 cu ft or 27,850 gal

'71 Review

GENERAL

This project comprises a 0.25 MIGD total oxidation treatment plant with comminution, raw sewage pumping, diffused air aeration, final settling, chlorination, effluent and filters, a sludge holding tank and liquid sludge disposal together with approximately 1½ miles of 21-inch diameter trunk sewer. The plant's chief operator is assisted by a casual worker at weekends, during vacations and periods of sickness or unusually heavy workload.

The treatment process was affected by industrial waste discharges into the sewer system on several occasions during the year. During October, one especially heavy discharge of industrial waste completely disrupted the treatment process. The OWRC District Sanitary Engineer and the City of London Engineering Department were notified. The City Inspectors were unable to trace the source of the pollutant. Storm run-off containing high concentrations of clay and silt from areas under building development continued to be a problem during the Fall rain period. The effluent sand filters became plugged with the fine material and effluent was discharged directly to the creek except during day shift hours when the charging of the sand beds could be supervised.

EXPENDITURES

The operating cost for 1971 was $18, 607. 78. The cost per million gallons treated was $179. 79.

PLANT FLOWS and CHLORINATION

Plant flows during 1971 amounted to a total of 103.5 million gallons, a decrease of 29.2 percent below the 1970 flows. The design flow of .25 migd was exceeded significantly during the months of February, March, April and December. Flows during the month of April averaged 390, 000 gpd or 156 percent of the design capacity.

A total of 1815 pounds of chlorine was used at an average dose of 1.8 mg/l during the period May through November. A residual of 0.5 mg/l in the effluent was maintained during the chlorination period.

PLANT EFFICIENCY

The average strength of the raw sewage during the year was 127 mg/l BOD and 170 mg/l suspended solids. Final effluent averaged 11 mg/l BOD and 7 mg/l suspended solids, indicating reductions of 87 percent and 96 percent respectively on average over the year. From the probability graphs it can be seen that the effluent BOD met the OWRC objective of 15 mg/l 78 percent of the time and suspended solids 65 percent of the time. The above results are based on composite samples taken every two weeks.

The plant operated at an average of 150 percent of its hydraulic design capacity during February, March, April and December. During the remainder of the year, flows were reduced to near design levels.

AERATION

The mixed liquor suspended solids averaged 7780 mg/l during the year. The BOD loading per pound of MLSS was 0.02 pounds which was a decrease of 0.01 pounds.

EFFLUENT SAND FILTERS

The effluent sand filters were used all year except for nights and weekends in November and December when ponding due to silt plugging and freezing could not be observed by the operating staff. The sand filter effluent BOD averaged 11 mg/l and the suspended solids averaged 7 mg/l.

CONCLUSIONS

The plant operated 156 percent of its design capacity during the spring thaw period. Flows were then generally stabilized near the plant design level.

The plant produced a good effluent throughout the year.

The sand filters are a very effective form of tertiary treatment even under winter conditions but care had to be taken to minimize the affects of silt entering the system.

The filter media is being examined carefully to ascertain its filtering capacity and the need for replacement after 10 years service.

PROJECT COSTS

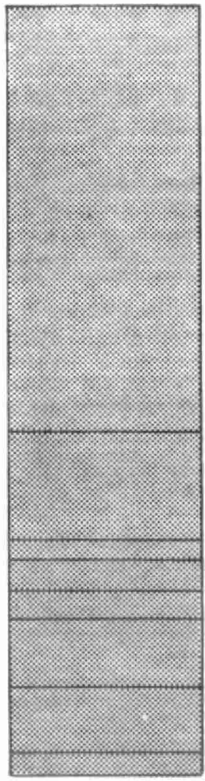
NET CAPITAL COST (Final)	$270,727.24
DEDUCT - Portion financed by CMHC/MDLB (Final)	65,773.40
Long Term Debt to OWRC	$204,953,84
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1971	$127,363.87
Net Operating	$ 18,723.03
Debt Retirement	17,673.00
Reserve	-
Interest Charged	11,496.04
TOTAL	$ 47,892.07

RESERVE ACCOUNT

Balance @ January 1, 1971	$ 20,841.66
Deposited by Municipality	-
Interest Earned	1,375.81
	$ 22,217.47
Less Expenditures	-
Balance @ December 31, 1971	$ 22,217.47

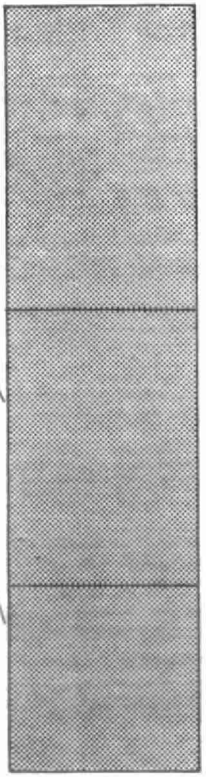
1971 COSTS

OPERATING COSTS



PAYROLL	57 %
FUEL	NIL %
POWER	13 %
CHEMICALS	2 %
GENERAL SUPPLIES	4 %
EQUIPMENT	4 %
REPAIRS & MAINTENANCE	9 %
SUNDRY	8 %
WATER	NIL %
TRAVEL	3 %

TOTAL ANNUAL COST



NET OPERATING	39 %
DEBT RETIREMENT	37 %
RESERVE	NIL %
INTEREST	24 %

YEARLY OPERATING COSTS

YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	TREATMENT COSTS	
			$ per million gal	¢ per lb BOD
1967	88.08	$13,914.02	$157.97	17 cents
1968	75.92	15,471.07	203.78	11 cents
1969	126.45	17,264.18	136.53	16 cents
1970	146.42	24,170.67	165.08	18 cents
1971	103.0	18,607.78	179.79	15 cents

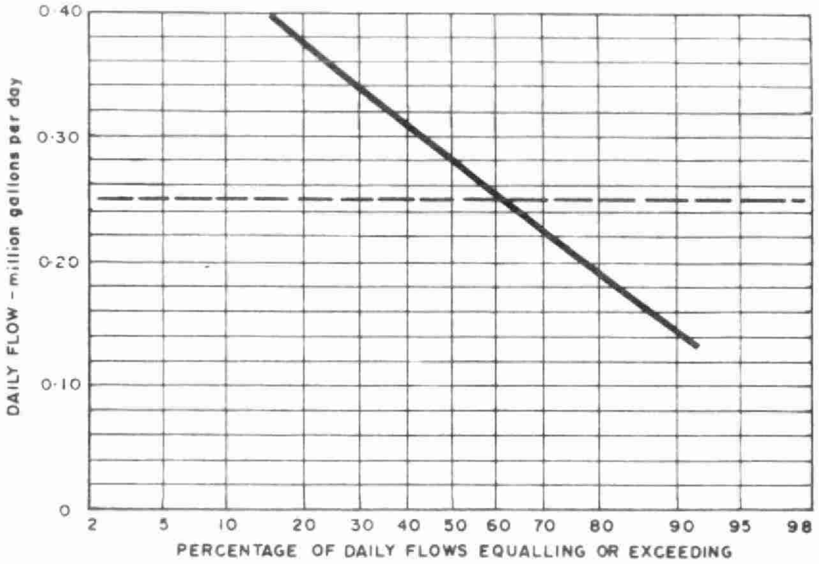
MONTHLY OPERATING COSTS

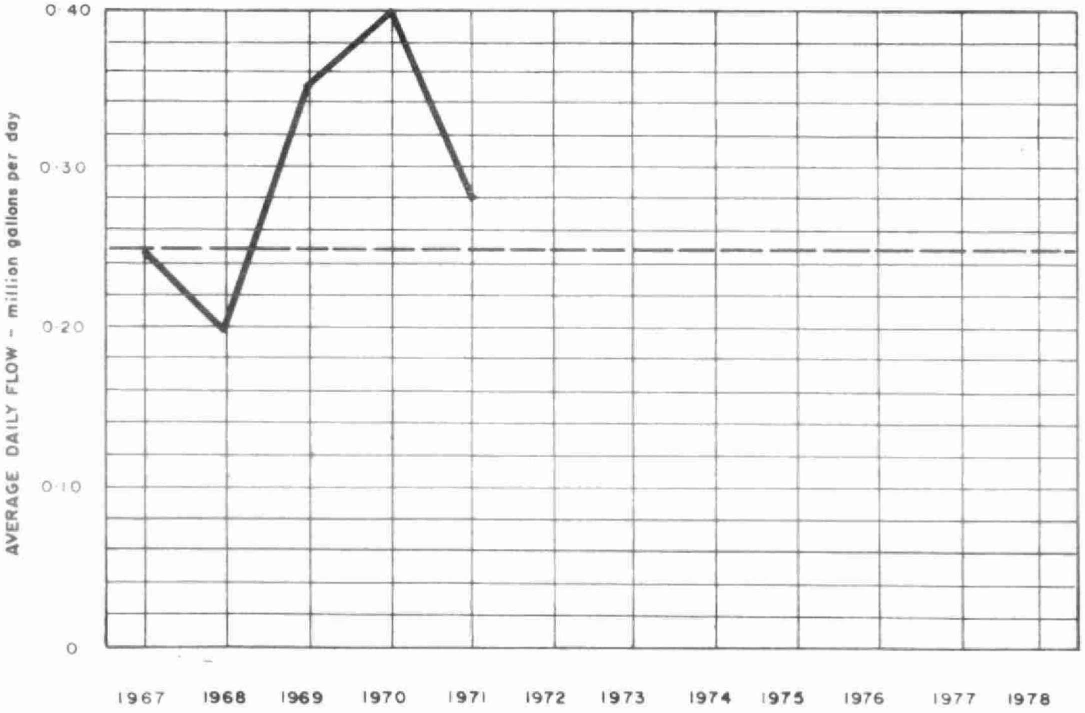
MONTH	TOTAL EXPENDITURE	REGULAR PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY*	WATER	TRAVEL
JAN	1038.78	644.93	298.18	-	-	-	-	-	95.67	-	-	-
FEB	1928.11	952.85	309.65	-	427.56	-	76.64	-	-	17.76	-	143.65
MAR	1189.62	643.09	205.06	-	226.98	-	75.22	-	-	39.27	-	-
APR	793.94	25.45	411.96	-	232.63	-	20.50	-	-	41.45	-	61.95
MAY	2250.92	618.41	294.05	-	198.78	341.10	88.15	-	678.10	19.73	-	12.60
JUNE	2084.36	651.94	47.85	-	167.58	-	64.40	-	434.08	664.66	-	53.85
JULY	932.76	535.60	13.74	-	165.78	-	88.44	-	68.73	60.47	-	-
AUG	1875.14	546.66	208.00	-	171.18	-	25.69	804.85	62.81	-	-	55.95
SEPT	1141.69	535.75	156.00	-	176.58	-	43.76	-	-	229.60	-	-
OCT	1078.84	521.37	208.27	-	178.38	-	29.40	-	75.60	17.52	-	48.30
NOV	1730.00	1167.03	309.65	-	186.78	(16.61)	40.64	-	19.65	22.86	-	-
DEC	2563.62	1144.18	252.34	-	236.28	-	194.08	32.13	182.32	355.04	-	167.25
TOTAL	18607.78	7987.26	2714.75	-	2368.51	324.49	746.92	836.98	1616.96	1468.36	-	543.55

Brackets indicate credit.

PROCESS DATA

FLOWS



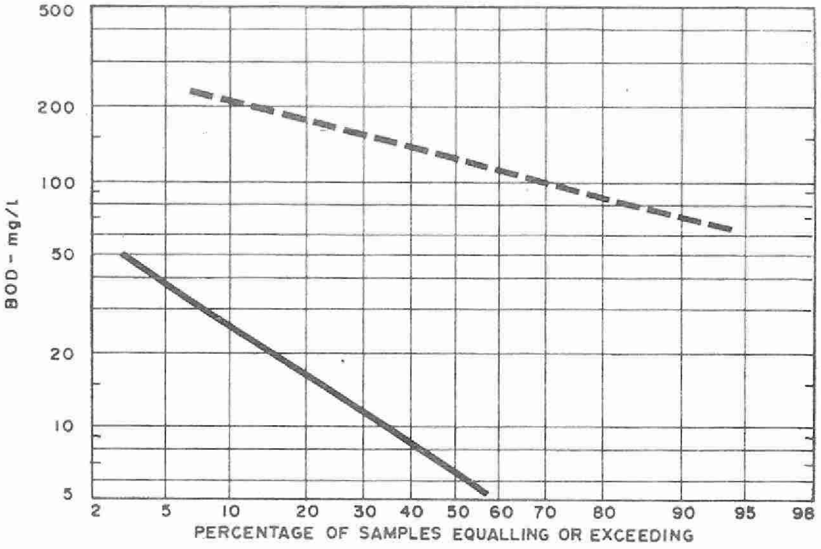


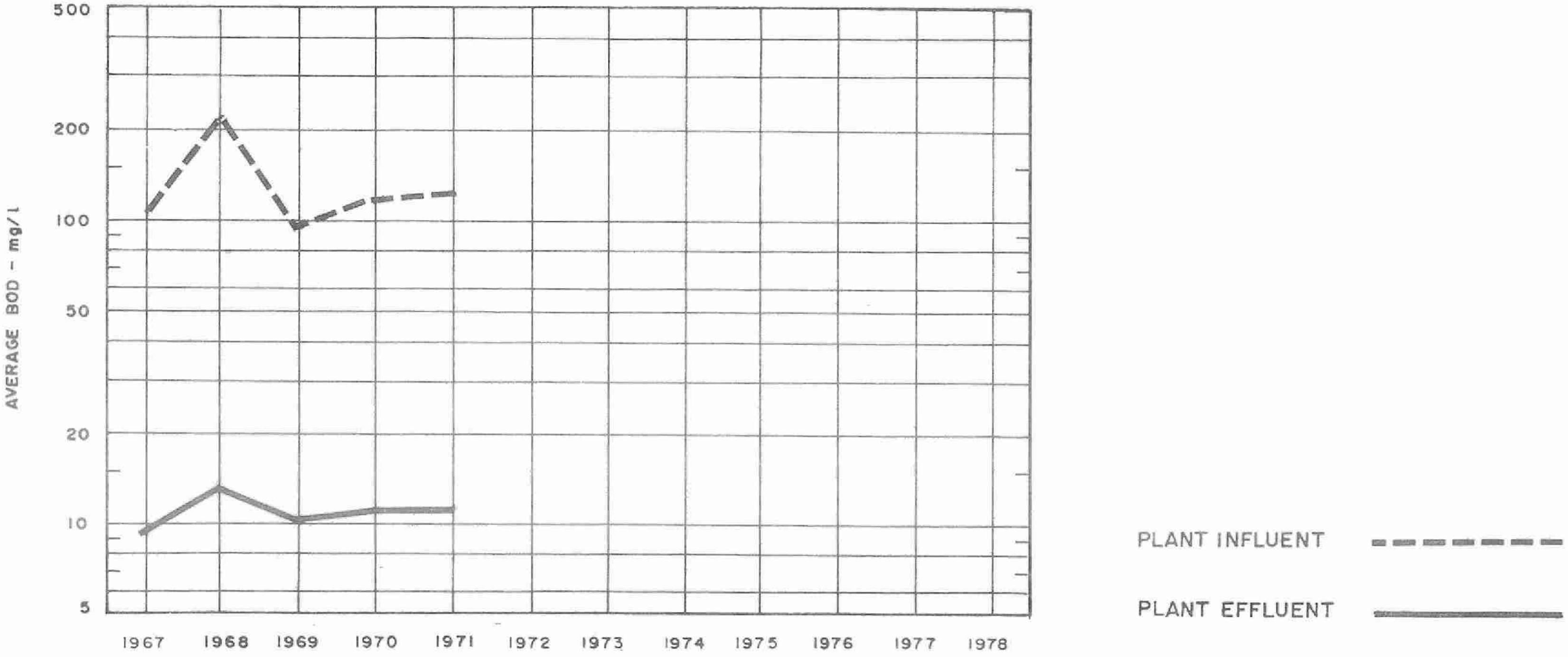
DESIGN CAPACITY – – – – – – –

PLANT PERFORMANCE

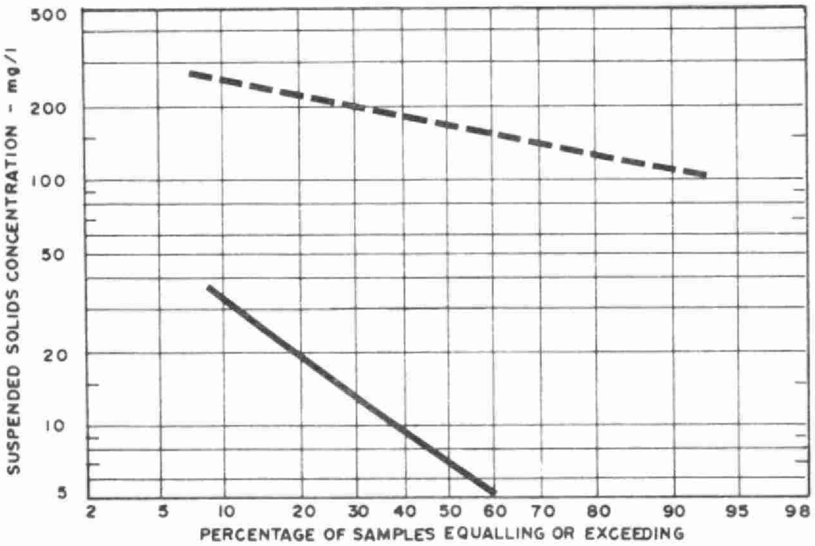
MONTH	FLOWS				BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				TOTAL PHOSPHORUS		
	TOTAL FLOW	AVERAGE DAY	MAXIMUM DAY	MAXIMUM RATE	INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	RED$^{\underline{n}}$
	million gallons	mil gal	mil gal	mgd	mg/l	mg/l	%	10^3 pounds	mg/l	mg/l	%	10^3 pounds	mg/l as P	mg/l as P	%
JAN	8.2	.26	.4	–	150	3	98	12.	135	3	98	11.	5.3	.8	85
FEB	10.7	.38	.6	–	125	3	98	13.	140	< 1	99	15.	6.8	.8	88
MAR	11.6	.38	.6	–	98	2	98	11.	153	4	97	17.	5.1	.8	84
APR	13.0	.39	.5	–	105	4	96	13.	175	2	98	22.	11.5	1.9	84
MAY	6.5	.21	.4	–	100	6	94	6.	115	6	95	7.	6.5	3.1	52
JUNE	6.0	.20	.3	–	92	8	91	5.	132	6	60	8.	6.7	2.6	61
JULY	7.0	.23	.4	–	135	12	91	9.	155	8	95	11.	14.0	2.9	79
AUG	6.6	.21	.3	–	155	13	92	9.	200	4	98	13.	18.0	2.9	84
SEPT	7.7	.26	.3	–	150	22	85	10.	180	10	94	13.	8.1	4.2	48
OCT	8.2	.26	.5	–	200	37	82	13.	245	15	94	19.	7.5	4.5	44
NOV	8.2	.27	.4	–	150	8	95	12.	275	9	97	22.	8.3	2.8	66
DEC	9.8	.32	.4	–	105	5	95	10.	150	15	90	13.	6.5	1.7	74
TOTAL	103.5	–	–	–	–	–	–	123.	–	–	–	171.	–	–	–
AVG.	–	.28	MAXIMUM .6	MAXIMUM –	127	11	91	10.	170	7	96	14.	8.7	2.4	72
No. of Samples	–	–	–	–	23	23	–	–	24	23	–	–	12	12	–

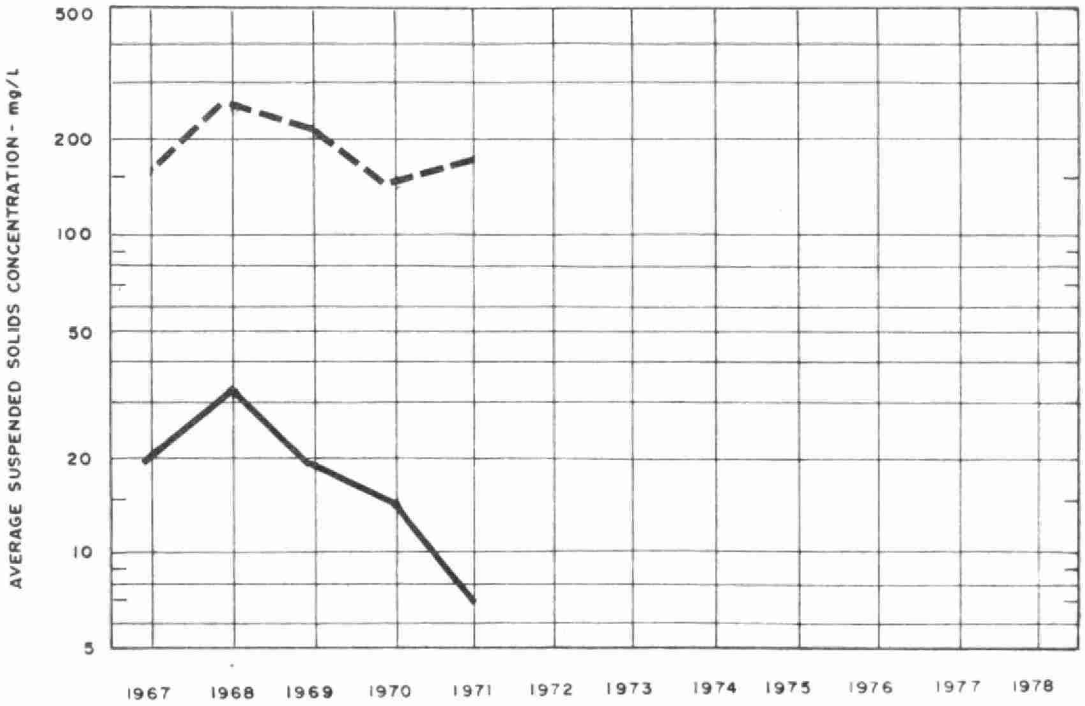
BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS





PLANT INFLUENT - - - - - -

PLANT EFFLUENT ———

TREATMENT DATA

MONTH	GRIT	CHLORINATION		AERATION			WASTE SLUDGE			AEROBIC DIGESTER			
	QUANTITY REMOVED cubic feet	Cl_2 USED pounds	AVG. DOSAGE mg/l	MLSS CONC mg/l	F/M day^{-1}	AIR USED $\frac{1000\ ft^3}{lb\ BOD}$	QUANTITY 10^3 gallons	SUSPENDED SOLIDS mg/l	VOL. SOLIDS %	QUANTITY REMOVED 10 gallons	SUSPENDED SOLIDS mg/l	VOL. SOLIDS %	AMOUNT HAULED cubic yards
JAN	0			7800	.02	1.3	10	14400	51				
FEB	0			6800	.03	1.1	16	12100	54				
MAR	0			6300	.02	1.5	10	19600	48				
APR	0			6400	.02	1.2	10	13000	50				
MAY	0	196	3.0	7300	.01	2.4	6	14200	58				
JUNE	0	269	4.4	8300	.03	1.9	10	16800	58				
JULY	0	282	4.0	8400	–	1.6	8	18700	61				
AUG	0	295	4.5	8400	.02	1.7	10	17700	59				
SEPT	0	349	4.5	8200	.04	1.6	24	17300	59				
OCT	0	260	3.2	8300	.02	1.5	24	16700	62				
NOV	0	164	2.0	8600	–	1.5	14	24600	62				
DEC	0	–	–	8500	.01	–	12	18000	62				
TOTAL	0	1815	–	–	–	–	154	–	–		–	–	
AVG.	0 cu. ft/mil gal	259	1.8	7780	.02	1.6	13	16900	57				

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